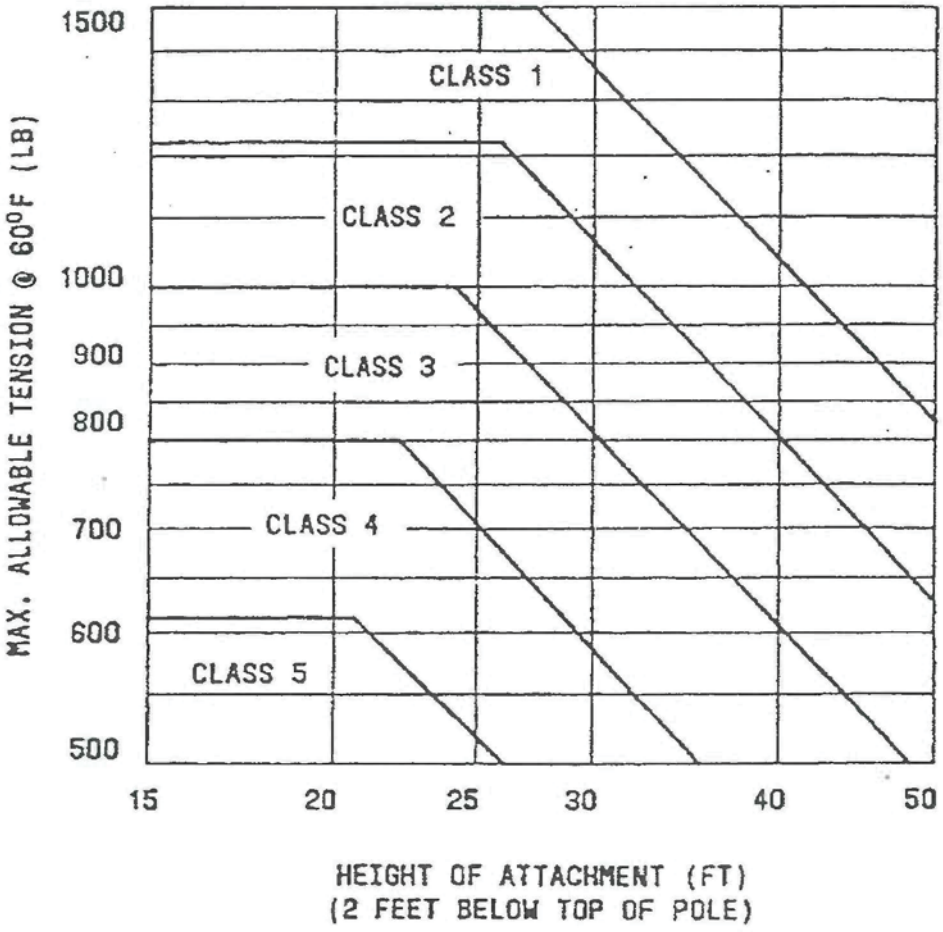
To determine the pole class based on everyday unbalanced tensions:

1. Using stringing tension of wire or tension of strand with cable in place, compute unbalanced tension for each wire and cable by the method outlined above for storm-loaded tensions.

2. Convert to equivalent load 2 feet from top of pole.

3. Combine equivalent loads for all attachments and find pole class from the chart below. The pole class thus determined will have a safety factor of three and a deflection of not more than 1/2 inch per foot of pole height.



Depth Of Setting Unguyed Corner And Dead-End Poles

Unguyed corner and dead-end poles should be set at a greater-than-normal depth to limit tilting. The depth of set depends on the maximum ground-line moment under storm-loading conditions.

To determine ground-line moment, add the equivalent loads determined in steps (1) and (2) under storm loading above before applying safety factors. Multiply this sum by the distance from ground line to 2 feet below top of pole. The result is the ground-line moment in pound-feet.

Frost Depth (Ft)	Corner Pull (Ft)	Maximum Ground-Line Moment (1000 Lb-Ft)								
		20	40	50	70	90	110	130	160	200
		Depth of Pole Set (Ft)								
0 to 1	0-2½	5	5	5½	6	6½	7	7½	8	8½
	2½-5	6½	6½	7	7½	8	8½	9	9½	9½1
	5-15	6½	7	7	8	8½	9	9	9½	0
	>15	7	7½	8	8½	9	9½	9½	10	10½
1 to 2	0-2½	5½	5½	6	6½	7	7½	8	8½	9
	2½-5	7	7	7½	8	8	8½	9	9½	9½
	5-15	7	7½	8	8½	9	9½	9½	10	10
	>15	7½	8	8½	9	9	9½	9½	10	10½
2 to 3	0-2½	6	6	6½	7	7½	7½	8	8½	9
	2½-5	7	7½	8	8½	8½	9	9	9½	9½
	5-15	7½	8	8½	8½	9	9½	9½	10	10½
	>15	8	8½	8½	9	9	9½	9½	10	10½

Slack Span Design

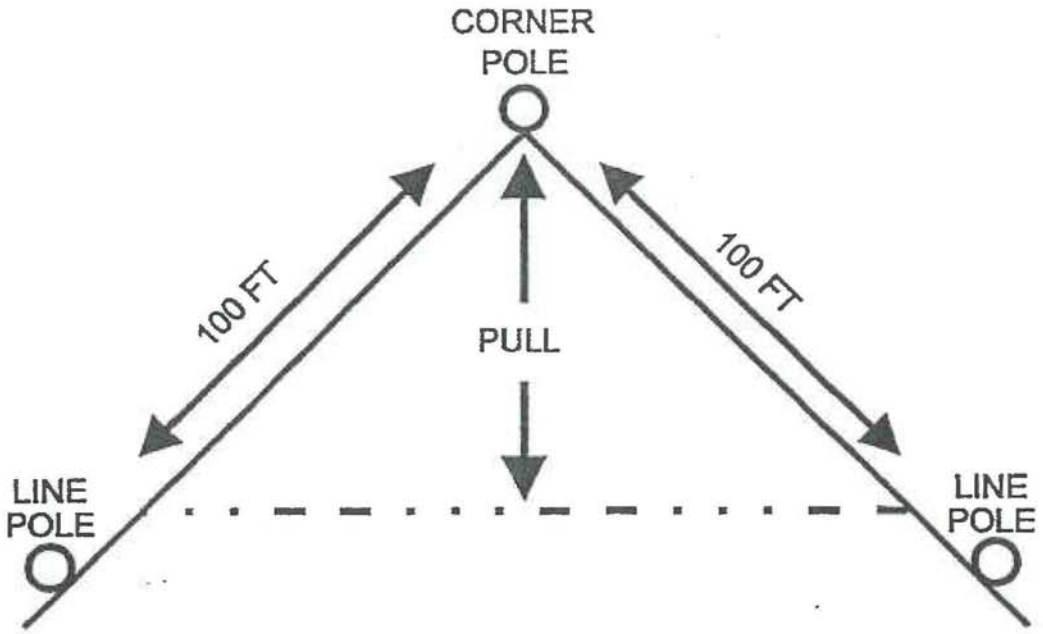
With normal stringing tensions, the unbalanced load on an unguyed dead-end pole may exceed the strength of the largest available pole. This limitation may be overcome by using less-than-normal stringing tension in the dead-end span. Obtain line tension from the following table entitled "Tension with Cable in Place at 60°F"; then determine pole class from the earlier chart.

		Tension with Cable in Place at 60°F (Lb)						
			Cable Weight (Lb/Ft)					
Size of Strand	Stringing Tension (Lb)	Span Length (Ft)	0.5	1	2	3	4	5
6M	300	50	510	675	960	1200	1425	
		75	580	800	1160			
		100	645	940	1390			
	500	50	645	800	1080	1320		
		75	720	925	1290			
		100	840	1090				
	800	50	900	1000	1220	1460		
		75	925	1075	1420			
		100	1030	1265				
6.6M	300	50	460	590	845	1065	1265	1430
		75	510	710	1030	1300		
		100	610	875	1255			
	500	50	605	710	935	1150	1345	
		75	660	815	1120	1380		
		100	715	955	1340			
10M	300	50	520	700	1040	1300	1500	
		75	580	850	1250	1400		
		100	670	1025	1450			
	500	50	670	825	1125	1380		
		75	750	970	1350			
		100	840	1150				
	800	50	910	1035	1280			
		75	975	1150	1500			
		100	1050	1310				
16M 25M	Do not use slack span design							

Defining "PULL"

The pull on a pole is the tension exerted by the attachments to poles on either side of the pole in question.

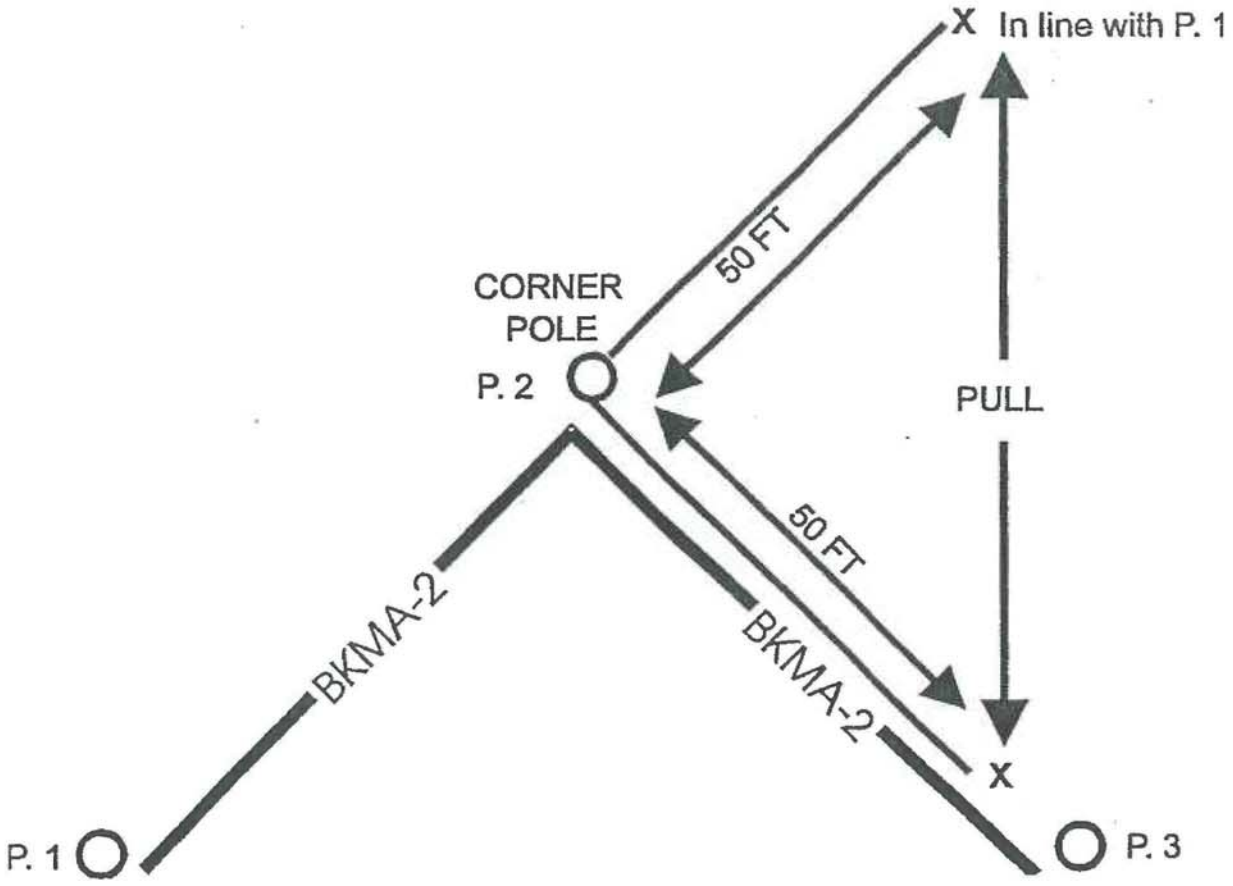
100' Method



Pull is measured in feet. It is used to convert Line Tension to Unbalanced Tension.

The 50' Method

- Measure and mark 50' from the pole to an adjacent pole.
- Measure and mark 50' from the pole in the direction opposite, but still in line with the other adjacent pole.
- The distance between these two marks is the pull on the pole in question.



Pole Line Guying

- Guying is done to support the cable or wire facilities
- Poles are guyed whenever there is a "pull' on them
- Pull is measured in feet
- Pull can also be referred to as the "corner" of the pole.

Types of Guys

- Side Guy / Corner Guy
- Dead End Guy
- Head Guy
- Pole to Pole Guy
- Tree Guy
- Storm Guy
- Push Brace
- Sidewalk Guy

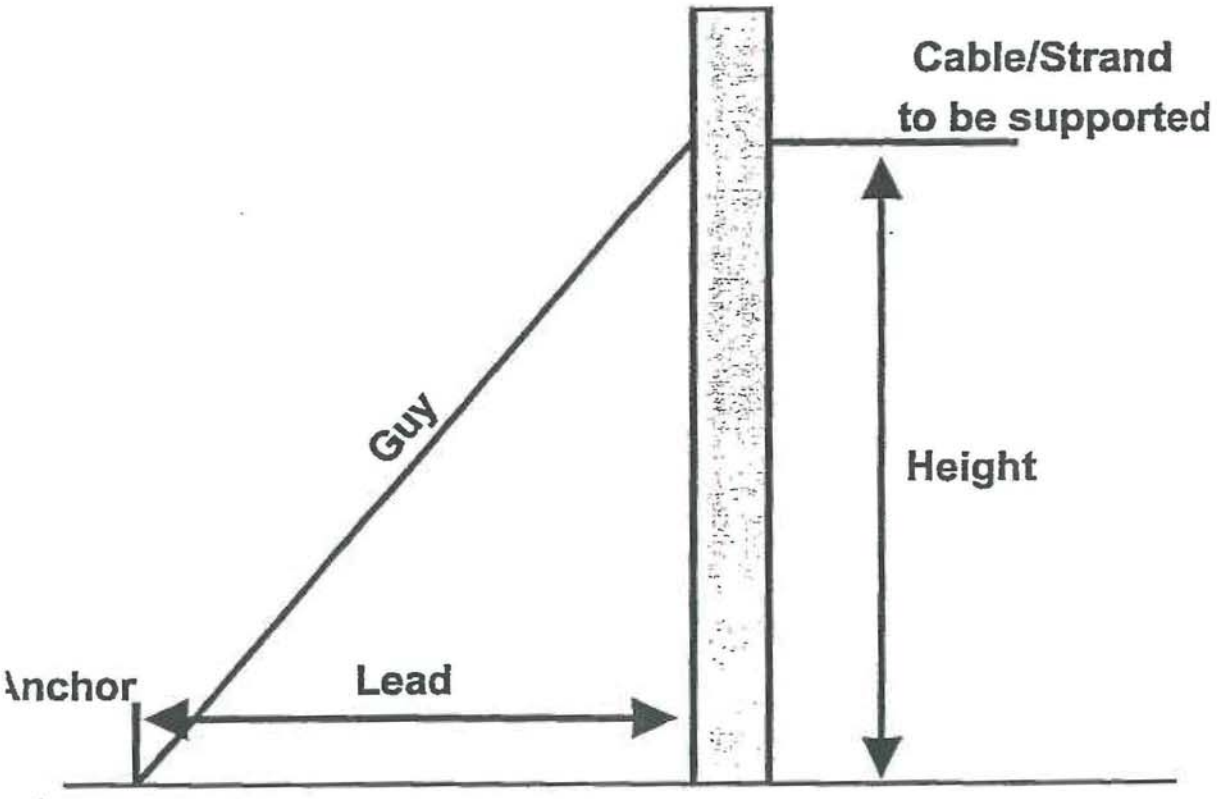
Sizing the Guy

The size of the guy is based on:

- The size of the facilities being supported
- The corner, or pull, on the pole
- The lead and height of the guy.

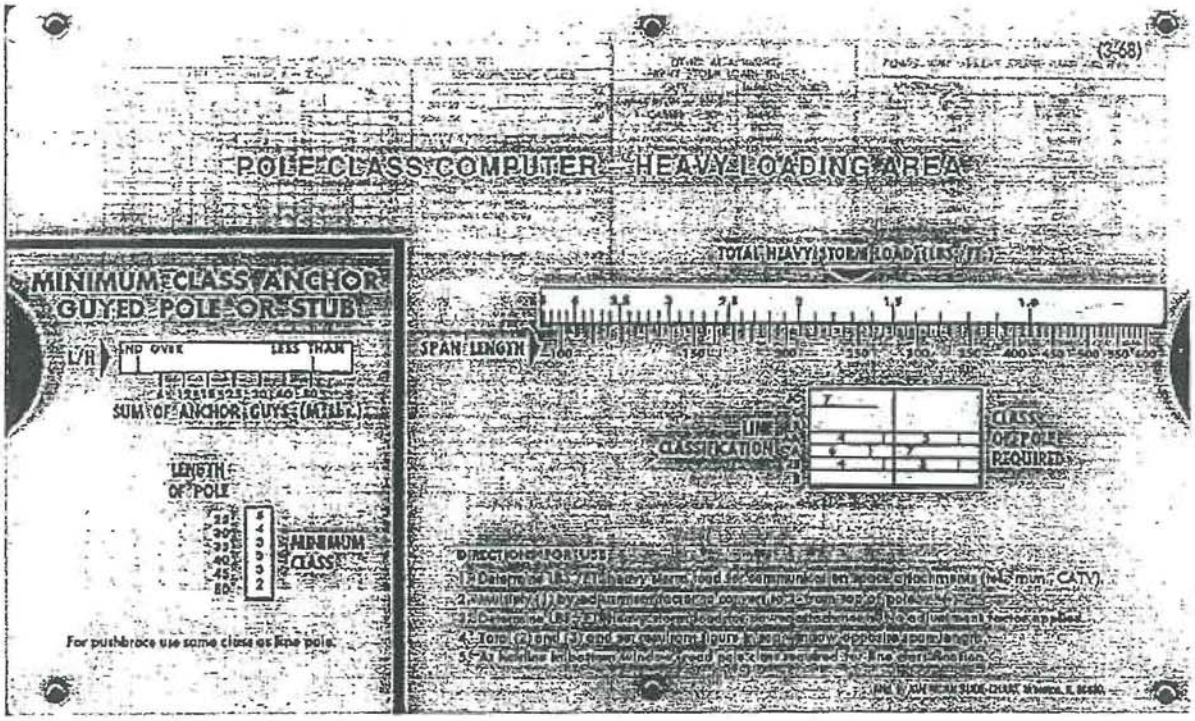
The lead of a guy is the horizontal distance from the pole to the anchor that the guy attaches to.

The height is the distance from the ground to the attachment being guyed.

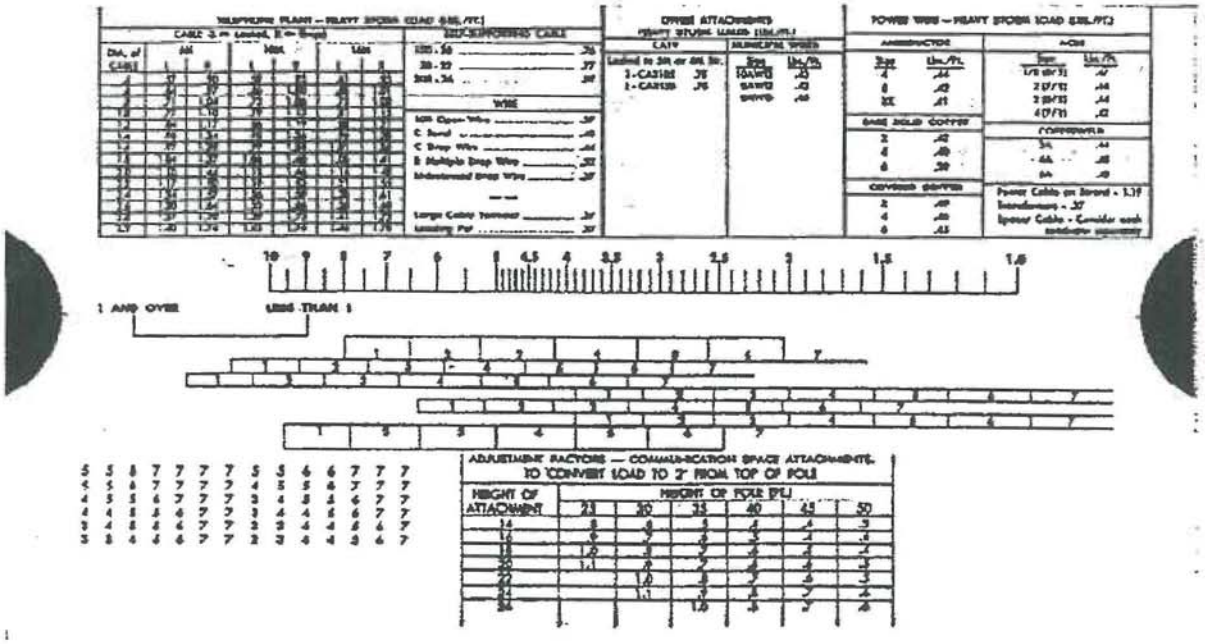


The Pole Class and Anchor Guy Computer

Pole Class Computer exterior



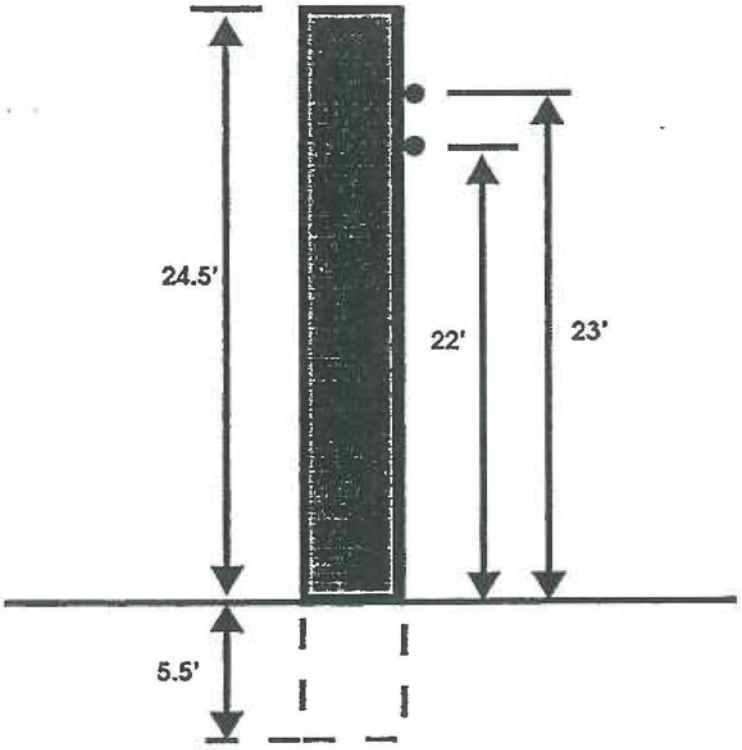
Pole Class Computer Interior



EXAMPLE #P1

Determine the class of a solely used telephone pole with the given conditions:

- Attachments at maximum load.
  - One cable, 1.2" in diameter, lashed to a 6M strand, attached at 23'.
  - One cable, 2.2" in diameter, lashed to a 10M strand, attached at 22'.
- Length of pole is 30'
- Average span length is 250'
- Line classification is A



EXAMPLE #P1 SOLUTION:

Step 1 Determine heavy Storm Load (Lbs./Ft.) for the cables attached.

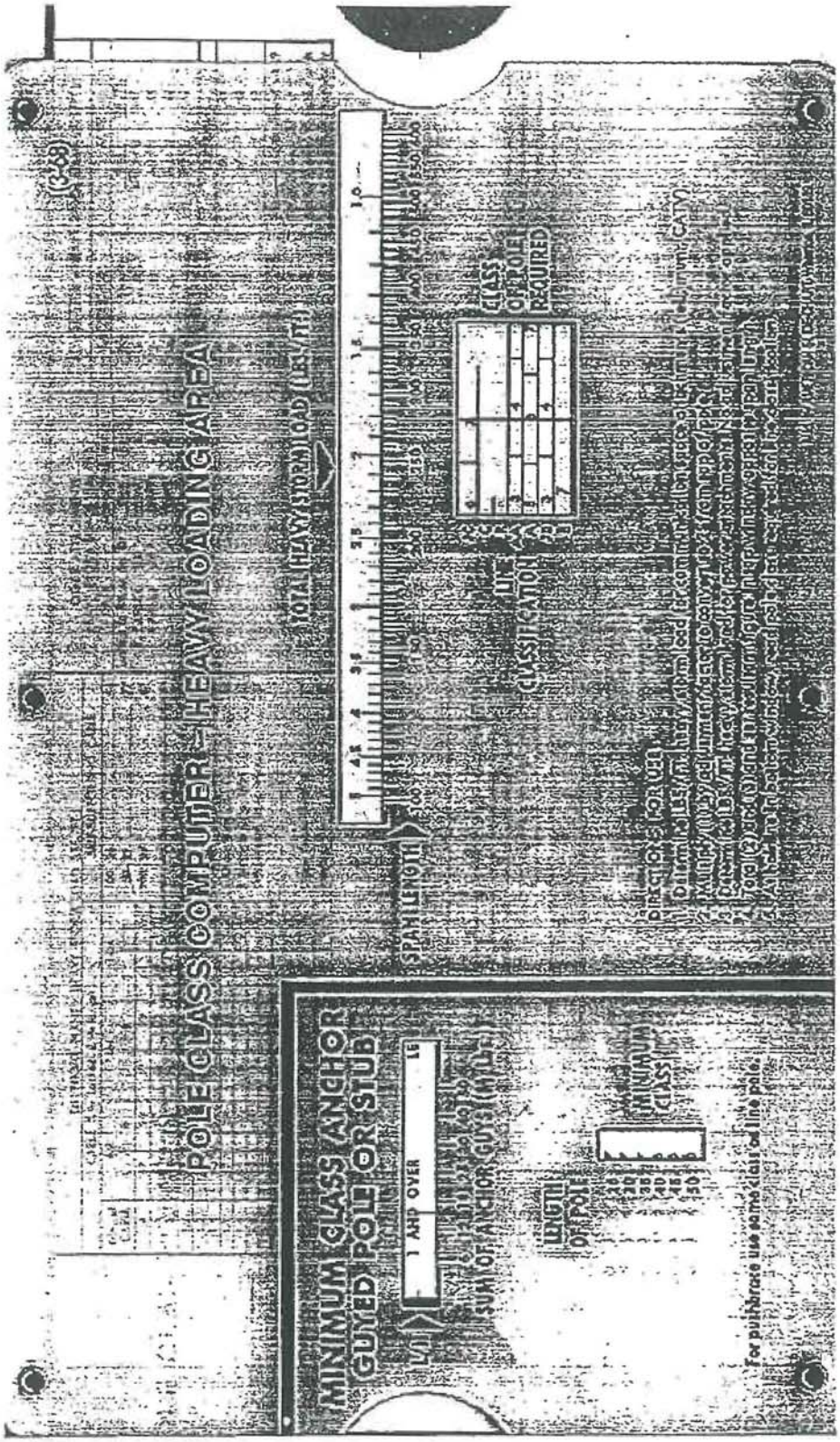
a) cable lashed to 6M strand = .84(lbs./ft.)
b) cable lashed to 10M strand = 1.19 (lbs./ft.)
c) Total storm load, .84+1.19 = 2.03(lbs./ft.)

Step 2 Multiply by Adjustment Factor shown on the bottom table of the interior slide. This is to convert the load to 2' from the top of the pole. In this example it is approx. 1 (30' pole, cable attached at 22' and 23')

Step 3 Determine Lbs./Ft. heavy storm load for Power Attachments. In this case, not applicable since the pole is not jointly owned.

Step 4 Total steps 2 and 3 and set the result in the top window opposite the span length (given as 250').
2.03 + 0 = 2.03 set this opposite 250ft.

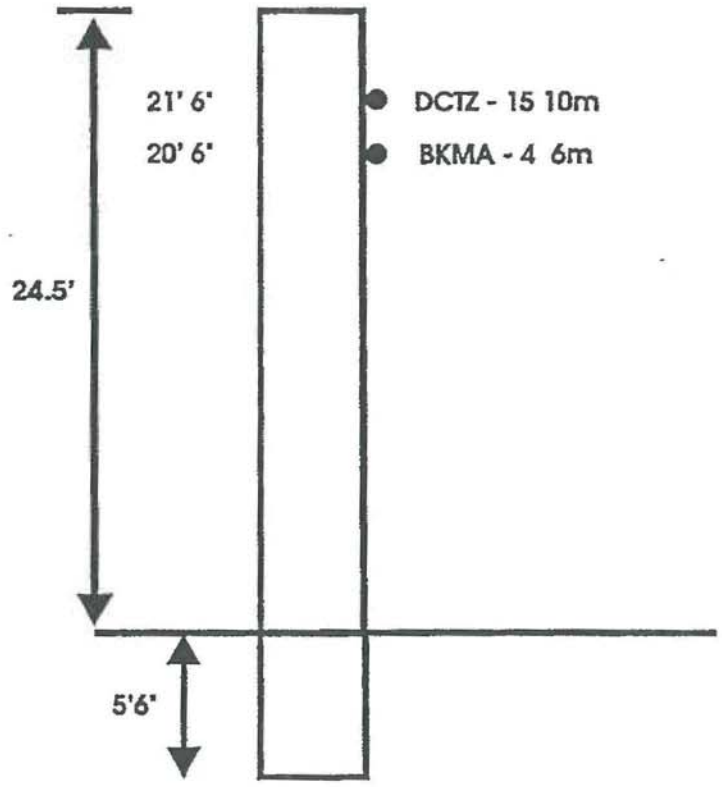
Step 5 Read hairline in the bottom window. Given line classification as A, the hairline falls through the Class 6 block.



EXAMPLE #P2

Determine the class of a solely used telephone pole with the given conditions:

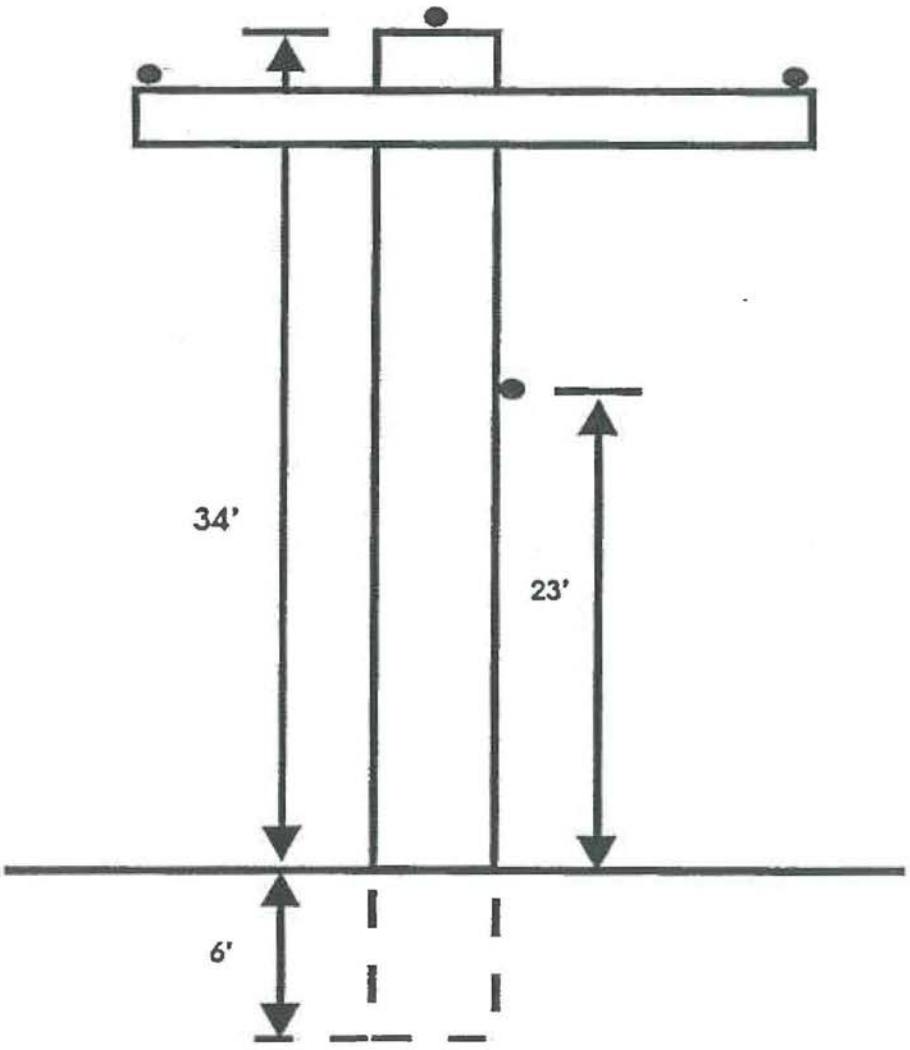
- Attachments at maximum load.
  - One BKMA-4 cable, 1.61" in diameter, lashed to a 6M strand, attached at 20'6".
  - One DCTZ-15 cable, 2.10" in diameter, lashed to a 10M strand, attached at 21'6".
- Length of pole is 30'
- Average span length is 150'
- Line classification is AA



EXAMPLE #P3

Determine the class of a jointly owned telephone pole with the given conditions:

- Attachments at maximum load.
  - One cable, BKMA-2, lashed to a 10M strand, attached at 23'.
  - Three #4 ACSR (7/1) power wires.
- Length of pole is 40'
- Average span length is 325'
- Line classification is JC



EXAMPLE #P3 SOLUTION:

Step 1 Determine heavy Storm Load (Lbs./Ft.) for the cables attached.

- One cable lashed to 10M strand = .86(lbs./ft.)

Step 2 Figuring the Adjustment Factor, each attachment separately:

BKMA-2 @ 23': .86 x .75 = .64

Step 3 Determine Lbs./Ft. heavy storm load for Power Attachments.
#4 ACSR (7/1) @ .42 lbs./ft.
3 x .42 = 1.26

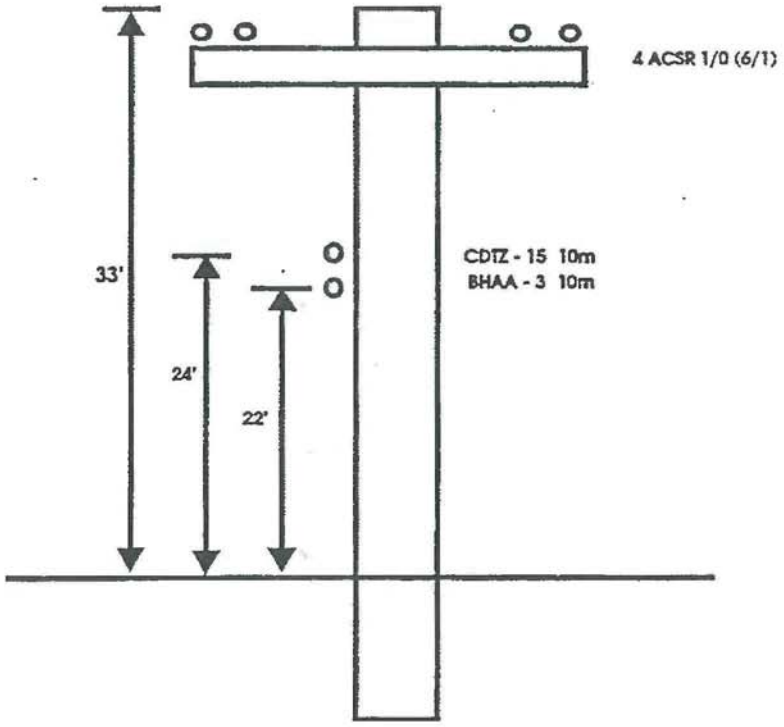
Step 4 Total steps 2 and 3 and set the result in the top window opposite the span length (given as 325').
.64 + 1.26 = 1.90 set this opposite 325ft.

Step 5 Read hairline in the bottom window. Given line classification as JC, the hairline falls through the Class 6 block.

IPLE #P4

ne the class of a jointly owned telephone pole with the given conditions:

- Attachments at maximum load.
  - One CDTZ-15 cable, 2.21" in diameter, lashed to a 10M strand, attached at 24'.
  - One BHAA-3 cable, 1.76" in diameter, lashed to a 10M strand, attached at 22'.
  - Four ACSR 1/0 (6/1) power wires attached at 33'
- Length of pole is 40'
- Average span length is 175'
- Line classification is JC



Guy Rods And Anchors

M = 1000 lbs.

GUY RODS					
Dia. (in.)	1/2	5/8	3/4	1	1-1/4
Length (ft.)	7	8	9	10	10
Marking*	6M	12M	18M	26M	32M
Type(s) avail.** THIMBLE	S	SINGLE DBL	D, T	D, T	D, T
EXPANDING ANCHOR					
Dia. (in.)	6	8	10	12	12
B GUY ANCHOR (Screw Type)					
Size No. and Nominal Dia. (in.)	9	11	13 or 15	-	-
PLATE ANCHOR					
Type	617	622	827	1040S	-
Dimensions (in.)	6 x 17	6 x 22	8 x 27	10 x 40	-
PLANK ANCHOR					
Size	20 or 24	20 or 24	20 or 24	24	-

* Indicates maximum size guy or combination of guys. For example, an 18M rod can take three 6M guys or one 10M and one 6M or one 16M. (Consider the 6.6M guy to be the same as 6M.

** S = Single thimble eye. D = Double thimble eye. T = Triple thimble eye.

Guy Anchors

Power Installed Screw Anchor

Soil Grade	Anchor Size and Type	Rod Size Marking	Eye Nut	Buying Load
1	5-Twin 4	1" 32M	Triple	Up to 32M
2	3-Twin 8	1" 32M	Triple	Up to 32M
2	6-Single 8	3/4" 18M	Double	Up to 18M
5	1-Twin 10	1" 32M	Triple	Up to 32M
5	4-Twin 8	3/4" 18M	Double	Up to 18M
5	7-Single 8	5/8" 12M	Double	Up to 12M
7	2-Twin 10	3/4" 18M	Double	Up to 18M

Guying Rules (From BSP 621-410-206)

1. Each cable suspension strand should be guyed separately.

2. Exceptions:

   a) When the separation between suspension strands is less than or equal to 2 feet, a single guy may be used

   b) A single guy may be used for 3 16M or smaller suspension strands for a pole with a corner less than or equal to 6 feet

   c) When the corner is greater than 6 feet and 3 16M (or less) strands are attached, a single guy may be used for the 2 upper strands, but the third is to be guyed separately.

   d) In cases of 4 16M or smaller strands, single guys can be used for each pair of strands.

3. Poles should be guyed as follows:

Maximum Allowable Pull for Unguyed Corners

Size of Suspension Strand	Maximum Allowable Pull (Ft.)
6M or 6.6M	3
10M	2
16M or larger	Any detectable amount

4. Where the pull is 50' or less, a side guy should bisect the corner angle.

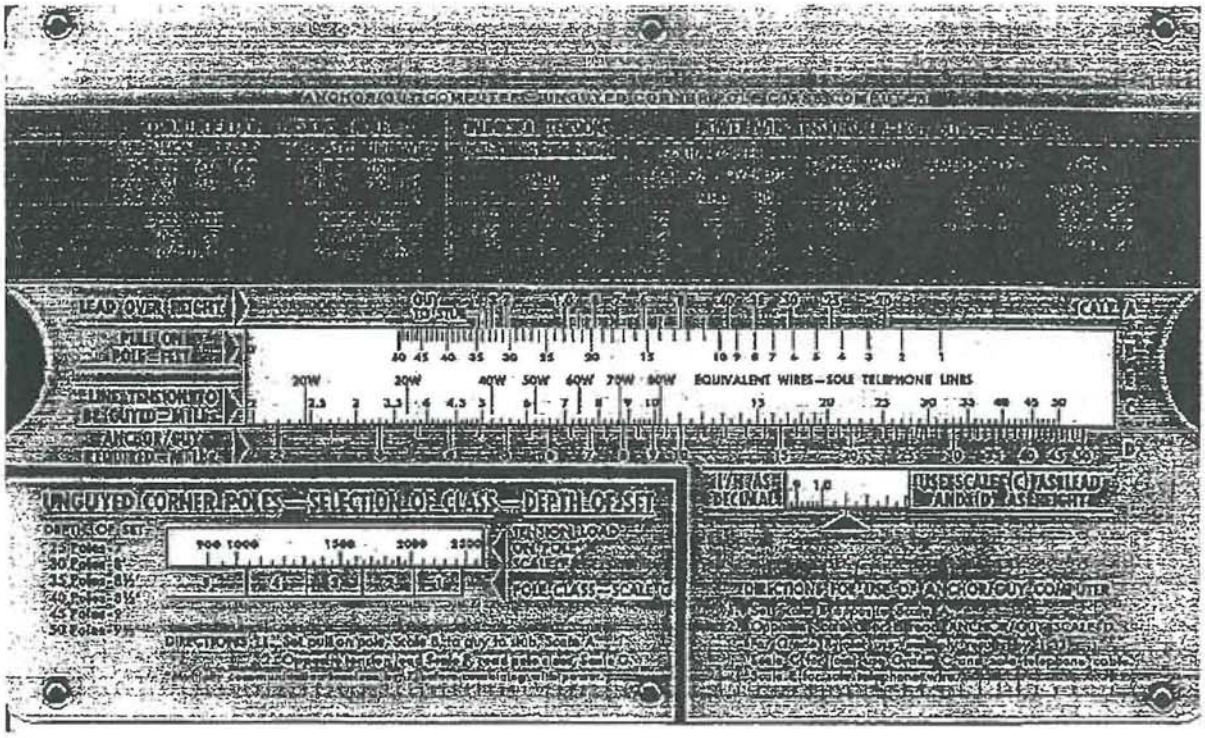
5. Where the pull is greater than 50', place two head guys.

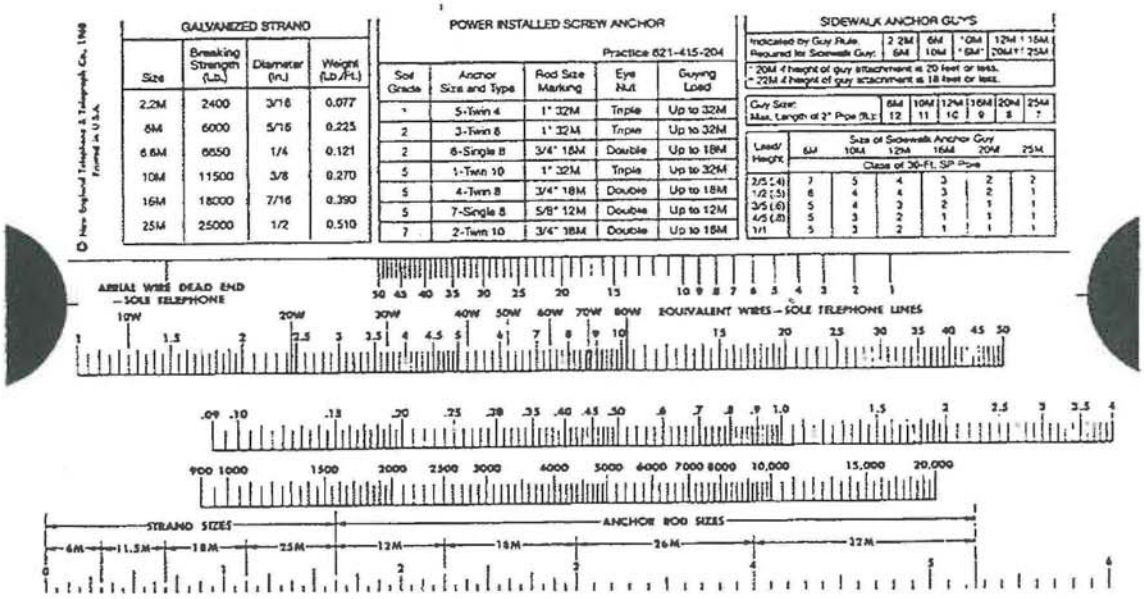
6. Where there is a right angle (70' pull) two head guys should be placed each in line with the suspension strand that it supports.

If the lead/height ratio is greater than or equal to 3/4, head guys for cables may be the same size as the strand they are supporting.

For a lead/height ratio between 1/2 and 3/4 involving 2 or 3 strands, the head guy should be one size greater than the strand it supports.

Using the Anchor/Guy Computer





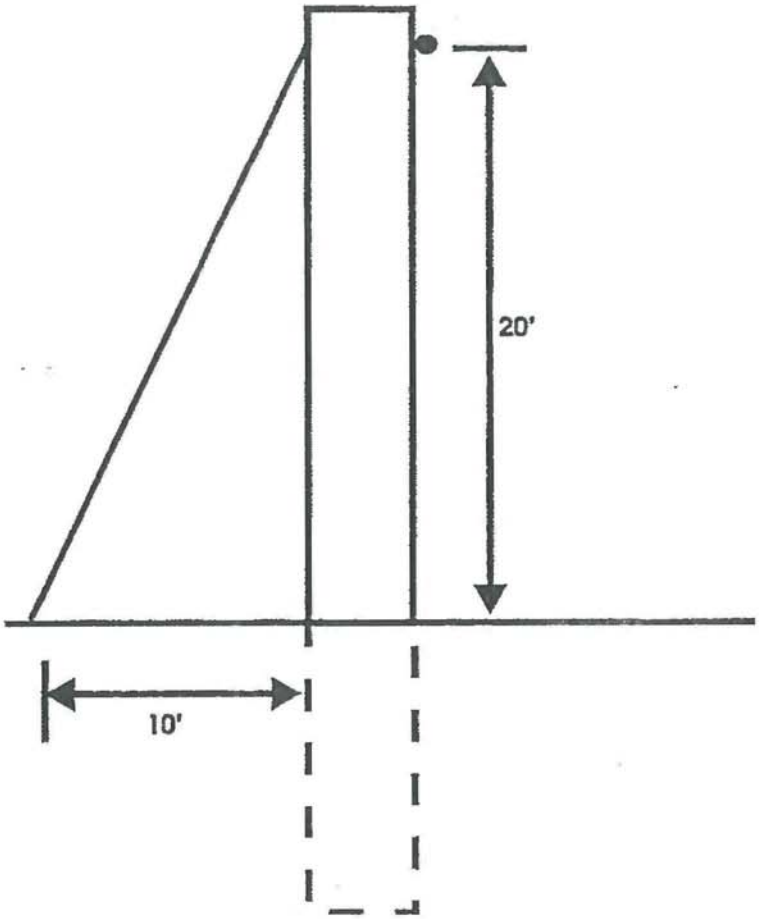
Necessary pieces of information:

- The Pull on the pole
- What strands are being guyed
- The Lead and Height for the anchor and guy

EXAMPLE #A1

Determine the size of anchor and guy for a solely used telephone pole with the given conditions:

- Attachments at maximum load.
  - One cable on 6M suspension strand.
- Lead over height is 10'/20'
- Pull on pole is 30'



EXAMPLE #A1 SOLUTION:

Step 1 Determine Lead over Height as a decimal. This may be done with a calculator or by setting 10' (SCALE C) opposite 20' (SCALE D) and reading the result of .50 in the L/H window..

Step 2 Pull on the pole (30') should be set beneath the lead over height decimal (.50).

30' (SCALE B) opposite .50 (SCALE A)

Step 3 We know that we are guying one 6M strand (given), by using the Tables in the shaded gray portion of the scale, we see that the tension is 3.6M for a 6M suspension strand.

Step 4 Leaving the computer set as it is we find 3.6M (Line Tension - SCALE C) and see that it is above 6.5 in SCALE D (Anchor/Guy required). This is the strength required of the anchor/guy, 6500lbs.

Step 5 Now looking at the tables inside the computer:

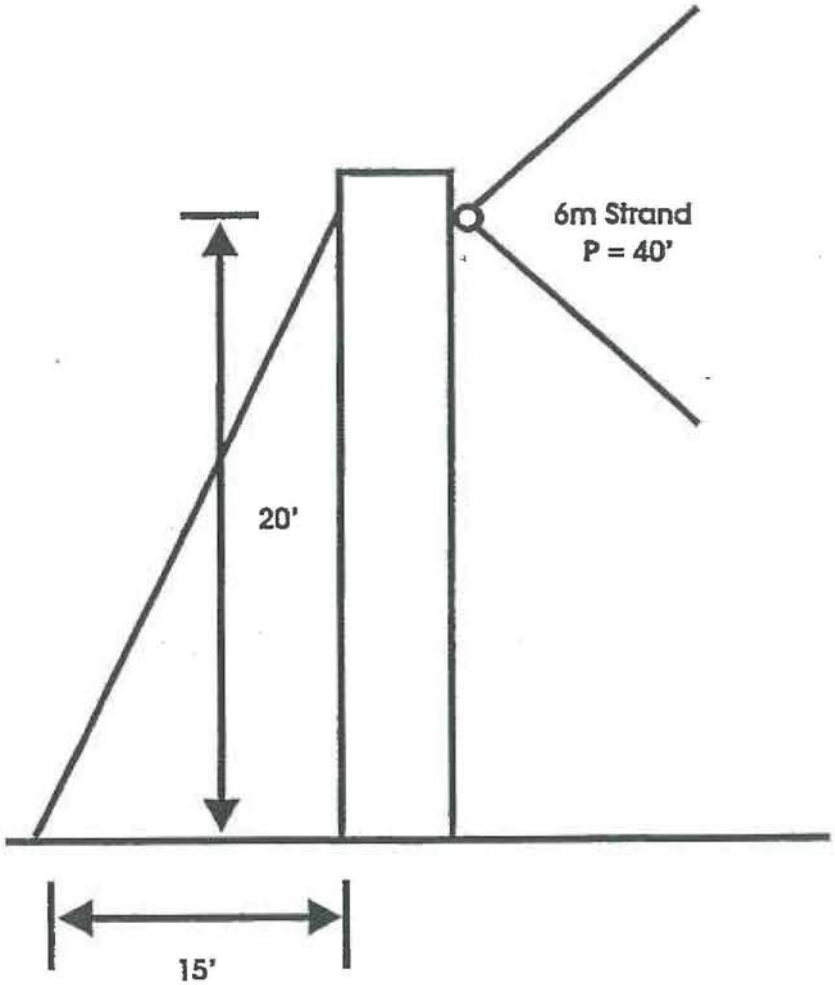
Under screw anchor we see that 5/8" anchor can withstand up to 12M load, which 6.5M is well within.

Under Galvanized Strand, 10M can withstand up to 11500 lbs., which 6500lbs. is well within (6.6M is not a standard guy strand size).

EXAMPLE #A2

Determine the size of anchor and guy for a solely used telephone pole with the given conditions:

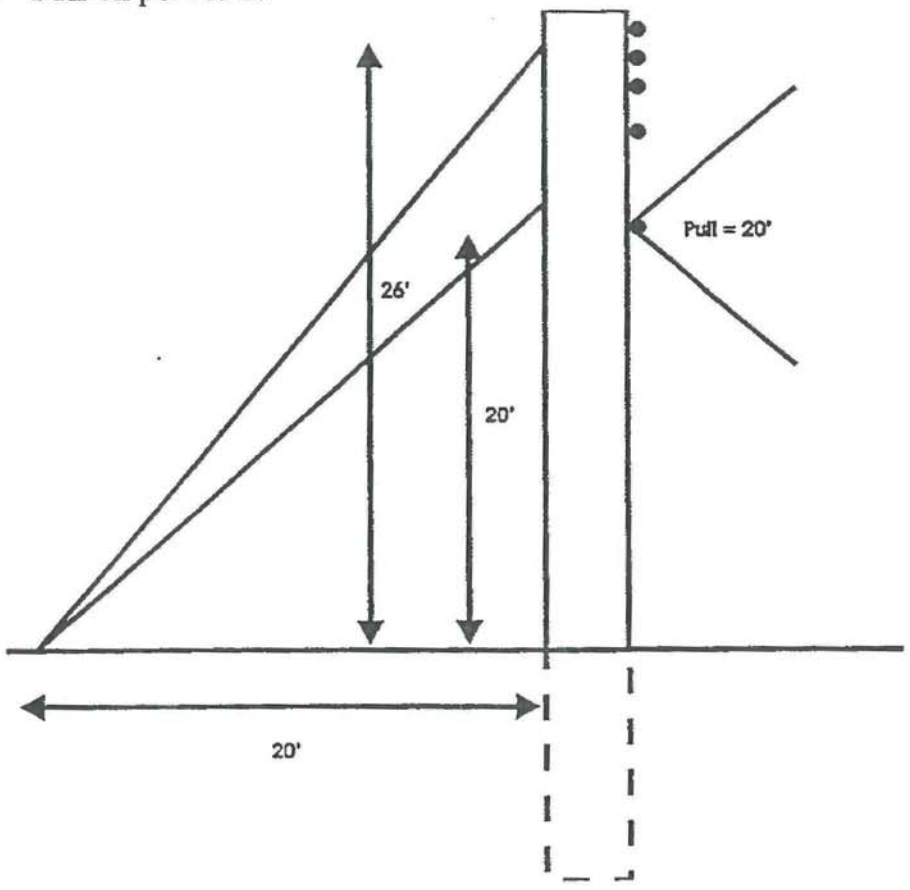
- Attachments at maximum load.
  - One cable on 6M suspension strand.
- Lead over height is 15'/20'
- Pull on pole is 40'



EXAMPLE #A3

Determine the size of anchor and guy for a jointly owned telephone pole with the given conditions:

- Two guy strands, one power, one telephone
  - Telephone guy is attached at 20'
  - Power guy is attached at 26'
- Attachments at maximum load.
  - One telephone cable on 10M suspension strand
  - 3 #4 ACSR (7/1) power wires
- Lead on anchor rod is 20'
- Pull on pole is 20'



EXAMPLE #A3 SOLUTION:

For anchor rod size:

Step 1 Determine power company requirement.

- Determine Lead over Height as a decimal.
  Set 20' (SCALE C) opposite 26' (SCALE D) resulting in .77 in the L/H window.
- Pull on the pole (20') should be set beneath the lead over height decimal (.77).
  20' (SCALE B) opposite .77 (SCALE A)
- Line tension to be guyed:
  3 - #4ACSR (7/1) has a tension of 3 x 1.4 = 4.2M
- Locate 4.2 line tension (SCALE C), find opposing anchor/guy requirement 4M (SCALE D)

Step 2 Determine Telephone requirement.

- Determine Lead over Height as a decimal.
  Set 20' (SCALE C) opposite 20' (SCALE D) resulting in 1.0 in the L/H window.
- Pull on the pole (20') should be set beneath the lead over height decimal (1.0).
  20' (SCALE B) opposite 1.0 (SCALE A)
- Line tension to be guyed:
  One 10M strand has a tension of 6.9M
- Locate 6.9 line tension (SCALE C), find opposing anchor/guy requirement 5.7M (SCALE D)

Step 3 Add the power and telephone requirements
4.0 + 5.7 = 9.7M

Anchor - 5/8" anchor can withstand up to 12M load (Grade C classification). For Grade B joint use multiply by 1.33
9.7 x 1.33 = 12.9M . Use 3/4" anchor to withstand up to 18M.

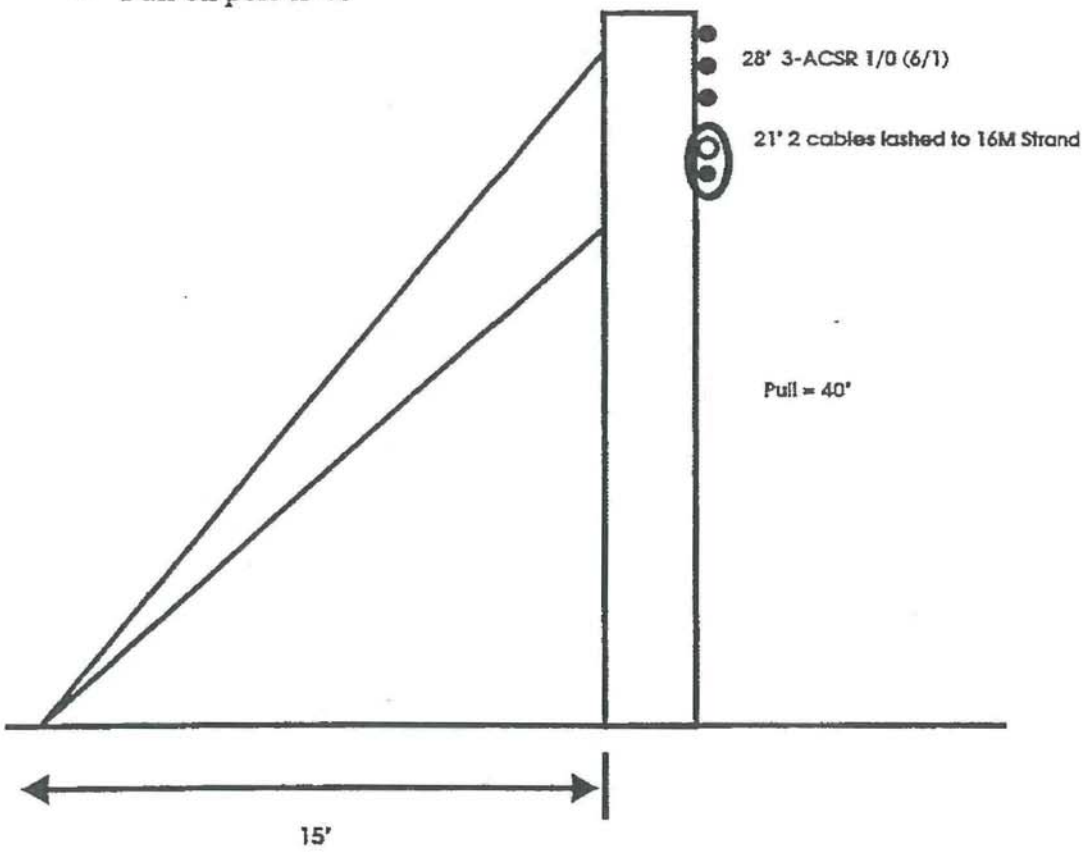
For Strand size:

- Telephone -6M can withstand up to 6000 lbs.
- Power - requirement of 4M, guy to be placed and determined by power company.

EXAMPLE #A4

Determine the size of anchor and guy for a jointly owned telephone pole with the given conditions:

- Two guy strands, one power, one telephone
  - Telephone guy is attached at 21'
  - Power guy is attached at 28'
- Attachments at maximum load.
  - Two telephone cables lashed to 16M suspension strand
  - 3 #4 ACSR 1/0(6/1) power wires
- Lead on anchor rod is 15'
- Pull on pole is 40'



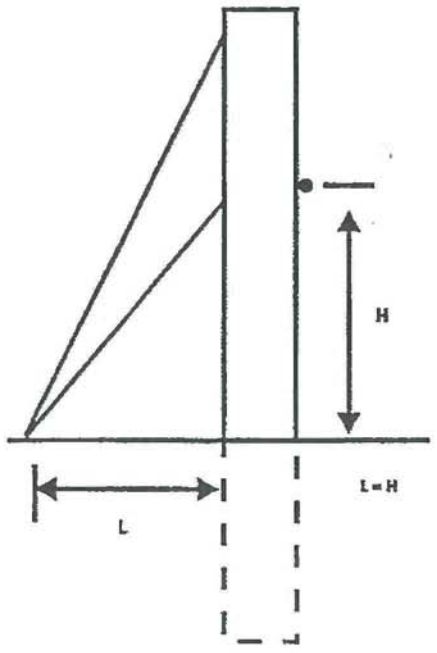
Other scales on this tool:

- Minimum Class Anchor Guyed Pole or Stub
- Unguyed Corner Poles - Selection of Class - Depth of Set
- Sidewalk Anchor Guys

Minimum Pole Class Example

Determine the minimum class of anchor guyed pole or stub given the following conditions:

- Attachments at maximum load.
  - One 6M (6000 lbs. power guy strand attached at the top of the pole
  - One 10M (11500 lbs.) telephone guy
- Length of pole is 35'
- Lead over height or anchor to top guy strand is 1.00



Solution to Minimum Pole Class Example

On pole Class Computer side of the tool - lower left portion.

Step 1 In upper window set L/H (1.0) opposite the sum of the guy strands (6 + 11.5 = 17.5 M lbs).

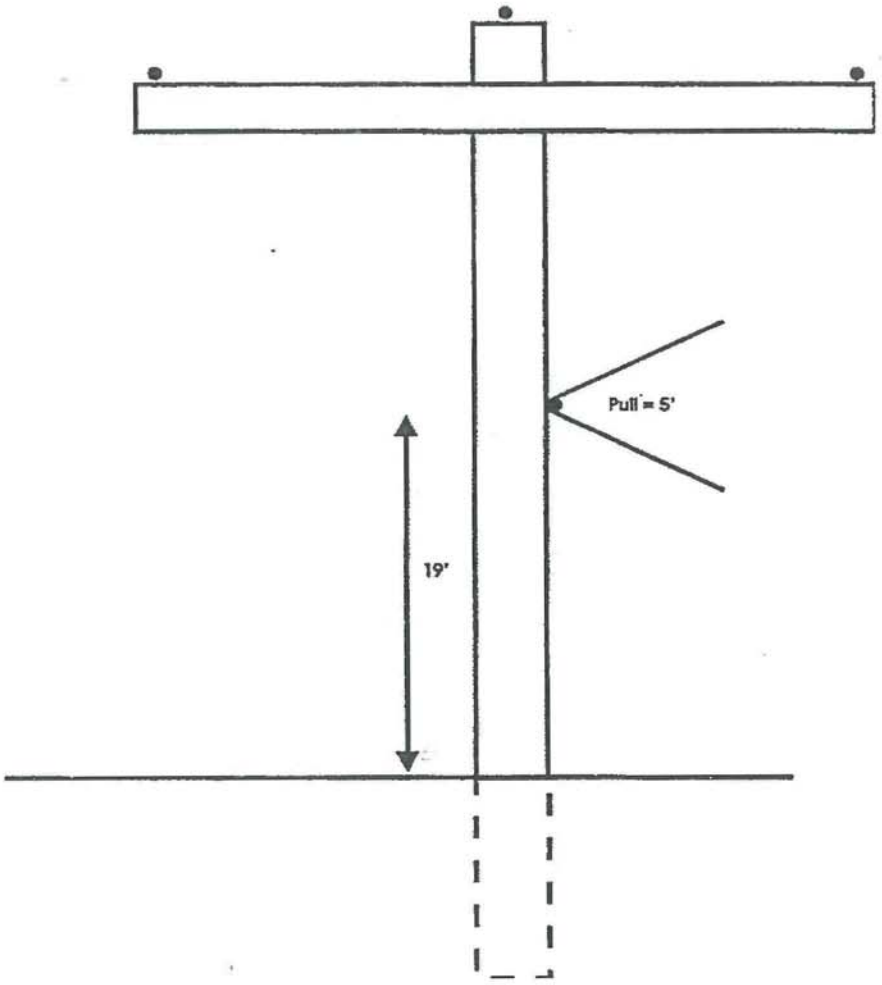
Step 2 17.5 does not show on the scale, figure up to the 18M mark

Step 3 Read pole class for 35' pole as Class 7.

Unguyed Corner Example

Determine the class and depth of set for the unguyed corner pole given the following conditions:

- Attachments :
  - Three #2 (7-1)ACSR power wires attached at the top of the pole
  - One 6M strand with cable attached at 19'
- Pull on pole is 5'



Solution to Unguyed Corner Example

On Anchor/Guy Computer side of the tool - lower left portion.

Step 1 Determine tensions of all attachments:

- Power - 3 x 2.1 = 6.3 Lbs.
- Telephone - 1 x 3.6 = 3.6 Lbs.
  3.6 x .7 = 2.5 Lbs. to convert to 2' from top of pole (as notated on computer directions)
- Total tension = 6.3 + 2.5 = 8.8M Lbs.

Step 2 Using the computer, set Pull on Pole (SCALE B) at 5', opposite the words "Guy To Stub" on SCALE A.

Step 3 Look at 8.8M (8800 lbs) on Tension Load on Pole (SCALE F) and read corresponding pole class of 1 (SCALE G).

Step 4 The depth of set for a 35' pole would be 8 1/2' according to the table at lower left corner of the tool.